



What is Episodic Memory?

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Memory Loss

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shape. www.PrimalForce.net

Episodic memory is a form of memory which allows someone to recall events of personal importance. Together with semantic memory, it makes up the declarative section of the long term memory, the part of memory concerned with facts and information, sort of like an encyclopedia in the brain. The other type of long term memory is procedural memory, which is the how-to section of the brain.

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Memory Loss Causes

How To Reverse Your Memory Loss Naturally Without Drugs. Advancedbionutritionals.com/Memory

The primary contrast between episodic and semantic memory is that episodic memories are memories which can be explicitly described and stated, while semantic memory is concerned with concepts and ideas. For example, the concept of a table is housed in the semantic memory, but when someone describes his or her kitchen table, this is an episodic memory. Procedural memory can also interact with declarative memory, as for example when someone drives a car, using procedural memory to remember how to drive, semantic memory to define a car, and episodic memory to recall specific driving experiences.

Episodic memories can pertain to general or specific events, such as what it feels like to ride a train, or a specific event which occurred on a train. It can also include facts, such as the names of world leaders, and so-called "flashbulb" memories, which are formed during periods of intense emotion. A classic example of a flashbulb memory from the 20th century is the assassination of President Kennedy, an event which was vividly remembered by people who were alive at the time.

It only takes one exposure to form an episodic memory, which is probably something which evolved early in human evolution, to teach people to avoid making potentially deadly mistakes. For example, someone who almost drowns as a child will often develop a fear of water in response to this single experience. People engage in episodic learning every day, but children often provide very striking examples of episodic learning, since they are exploring a world which is primarily unfamiliar to them, and hence they constantly have new experiences which are filed away in the episodic memory.

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Memory Exercise

Memory Loss Symptoms

Improve Your Memory

Human Body

This area of the long term memory is a critical part of identity. People are shaped by the events they participate in and interact with, and loss of episodic memories can cause people to experience confusion or distress, as they lack a context for their identities. Some researchers have suggested that episodic memory sometimes turns into semantic memory over time, with the brain lumping a family of similar experiences together to create a semantic concept. For example, distinct memories of various burns may be bundled together into the semantic memory to provide a concept of "hot," along with information about which kinds of things tend to be hot.

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Here comes

Mnemonic Guard

software that everyone can quickly and easily familiarise with

There is no need for memorising.

You can use photos that you
have taken to make your own
original screen.

If you do not have photo data at hand

you can use default
illustration images

April 6, 2009

What We Do

Mnemonic Security, Inc. specializes in uniquely secure, highly user-oriented security verification, authorization and applied solutions based on long-term visual memories (or visualized episode memories), which are portable to an extremely wide platform base.

Example of implementation on mobile-phone



Pass-Symbols, in this case, are photos of the developer of Mnemonic Guard taken in his babyhood, his wife 30 years ago, dolls and toys that his grown-up daughters used to play 20 years ago. Some pictures have been processed - turned sepia, monochrome or blurred - to confuse the attacker.

Our solution, **Mnemonic Guard**, can be applied on virtually any computing or communications device whether stand-alone or networked.



Matrix could be 3 x 3 or 8 x 8 depending on what to protect

The screen has unforgettable images, which you feel are special, plus meaningless ones.

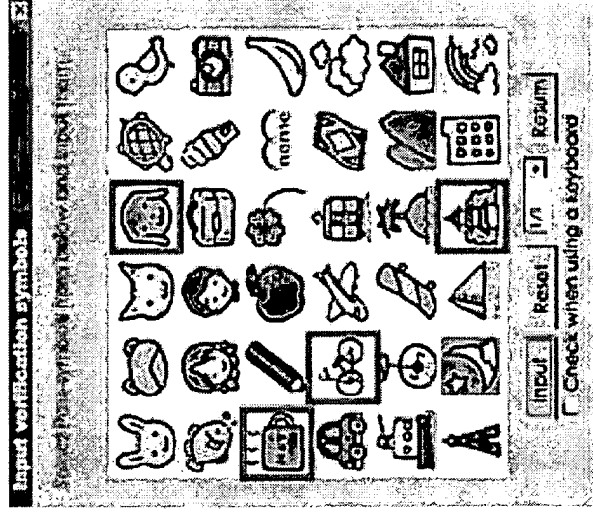
All you need to do for verification is to find several 'memorable' pictures that you feel are special to you, which will be no effort to remember.

The above example uses old pictures of tens of years ago, including ones of family members such as a nephew and niece, pet you used to have, memorable scenery from holiday. Even if you need to verify for the first time in several years, you will be able to find those photos without any difficulty. You can verify safely, whenever, wherever and without fail

If you do not have photo data at hand

You need to remember images that you like as Passwords from the screen. The screen itself acts as a reminder, and it is far easier to remember and less easy to forget than character passwords, because the screen contains a large volume of information.

For example, you can register symbols making a story based on your own experiences, such as when I was living in 'Kyoto where there are many temples', I used to take my 'dog' for a walk on my 'bike', and I enjoyed a cup of 'coffee' afterwards. In this way, you can easily remember your Pass-symbols.



**If a non-user tries to
verify illicitly...**

the person makes a kind of mistake that a renter would never make.

The software judges that this is not the registered user of the second

Forcible rejection

You, the registered user...
only need to select memorabilia
pictures (Pase symbols) for
verification.

Errors that registered users are likely to make are accepted repeatedly, therefore there is no need to worry.

If you like to continue to use characters

0	1	2	3	4	5
6	7	8	9	A	B
C	D	E	F	G	H
I	J	K	L	M	N
O	P	Q	R	S	T
U	V	W	X	Y	Z

You can keep using characters on the same kind of matrix.

If you select only 4 digits of [0123], for example, the data that are sent to the authentication server are not [0123] but the long sequence of identification codes allocated to each character/symbol.

These long sequence of data are resilient against various threats of ID Theft on the Internet.

With Mnemonic Guard, you can use photos, graphics and characters, say, all the visual objects as Pass-Symbols,

There are two ways to use memories

1. Endeavor to memorize something afresh
2. Use something that was memorized many years ago and stills reside in our memory

There are three objects of memory

- A. Characters B. Patterns (Gesture included) C. Photos and Graphics

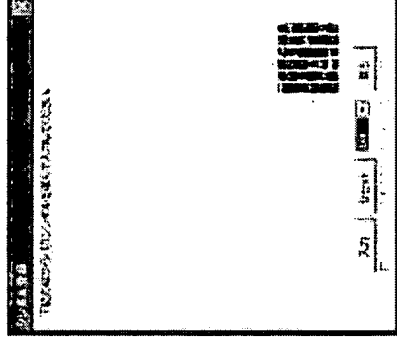
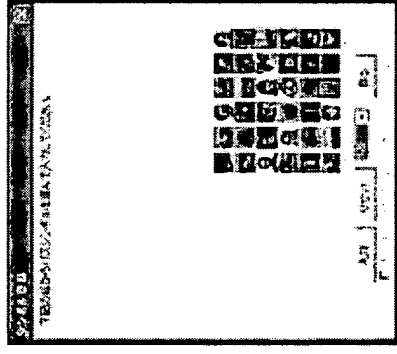
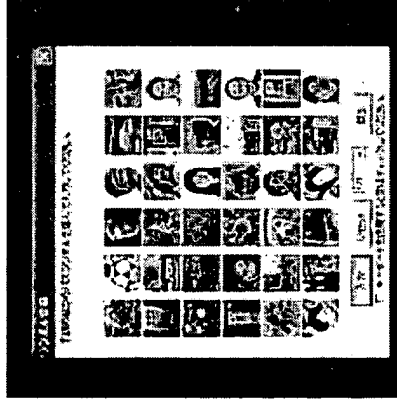
There are 6 combinations of the above. Features of them are as follows:

- 1A. Difficult to manage
- 1B. Difficult to manage
- 1C. Still difficult to manage though relatively easier than 1A and 1B.
- 2A. Vulnerable against guessing and dictionary-attacks
- 2B. Very weak in mathematical strength
- 2C.** Strong and easy to manage

Mnemonic Guard belongs to the category of **2C**. It does not mean, however, that Mnemonic Guard rejects 1A/1B/1C/2A/2B. All of them can be freely practiced on the platform of Mnemonic Guard.

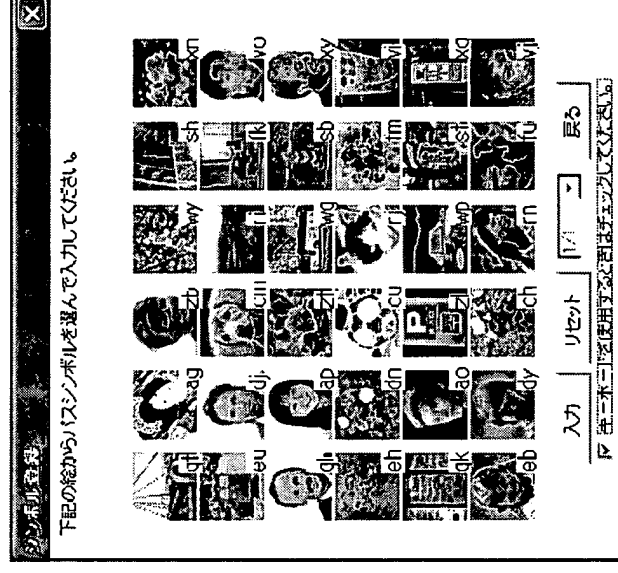
As shown below, we mitigate the shoulder surfing problem by

1. enabling the user to shrink the picture size



Just after recognizing PassSymbols, we have no difficulty in clicking the pictures which are shrunk at the same locations.

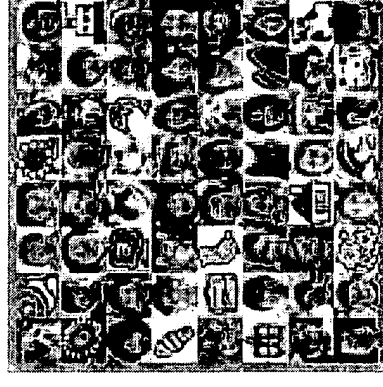
2. enabling the user to type the alphabets allocated to each picture. The alphabets are randomly allocated on each access.



The sequence of alphabets is different on each access, with onetime effect.

3. Anti-peeping films available on the market are also useful.

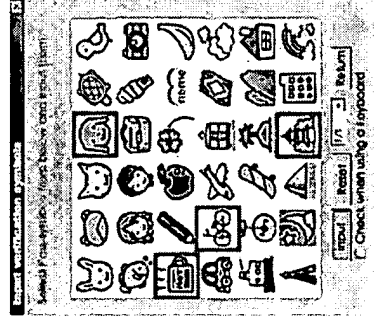
Mnemonic Guard is revolutionary in that it exploits the nature of long-term visual memory or visualized episode memory. Those visual memories that were acquired in our youth and still reside in our brains are unlikely to evaporate over additional time. Mnemonic Guard is based on the mind's ability to use long-term visual memories and it can easily be used by anyone in any environment. It is even practicable in panicky situations where character-based passwords might easily be forgotten.



For being easy for children to use, Mnemonic Guard was given Kids Design Award 2008 in Japan. At the other extreme, Mnemonic Guard is being recognized by information security professionals of the Japan's military because locating pictures of pleasant old memories as against meaningless decoys can be performed by anyone even in a badly panicky environment.

Easy-to-integrate security modules which prevent plagiarism, unauthorized access and data leakage from protected devices, including servers, desktops and cellular-devices. Authorized user access is simple and intuitive. Unauthorized access is greeted with a complete lockdown and deactivation of all the device's functions.

The Pitch - 2



Password protection of devices and data has long been used as access verification for authorized users. Increasingly it is recognized that the conventional character password is not nearly safe enough. Passwords that anyone can remember are also easily guessed by other people or by cracking techniques.

On the other hand, complicated passwords, which others have more difficulty guessing or cracking, are harder to remember, and are typically written down to keep at hand. Neither kind of character password can offer viably assured security.

We provide exceptional ease-of-use coupled with virtually uncrackable security by using 'Sequenced Pass-Symbols' for a security solution that users should never forget and that crackers should never defeat. The principal innovation of Mnemonic Guard is that it fully utilizes the persistent nature of long-term memory that had been acquired many years ago. Once stored in the user's memory as the symbolic sequenced pass-symbols, they are burned in by neurological means creating a security code that will not easily be forgotten, even after considerable passage of time.



Take up Windows NT/XP, which is particularly vulnerable as the result of LM Hash value storage. It is of little use to register up to 14 password digits unless the LM Hash storage is deactivated. And password-cracking software that can break the LM Hash is freely downloadable from the Internet. Our solution defends against this vulnerability allowing Windows to register passwords in excess of 15 digits using Mnemonic Guard to manage the long password internally while users need only to remember a simple visual sequence.

0	1	2	3	4	5
6	7	8	9	A	B
C	D	E	F	G	H
I	J	K	L	M	N
O	P	Q	R	S	T
U	V	W	X	Y	Z

Mnemonic Guard is also unique in that it will allow repeated mistakes that authorized users are likely to make, and provide the user multiple opportunities to enter the proper sequence. Significantly, our product has functionality to positively identify non-authorized users based on the nature of their entry errors. It detects mistakes that an authorized user is unlikely to make, such as selecting only wrong images, and shuts out impersonators expertly.

Mnemonic Guard also features an 'Emergency Button' function allowing for a specific secret image, when entered, to silently alert the program and thus the proper authorities to the presence of intimidators which may require immediate action.



Business Model

Mnemonic Guard

The potential market for **Mnemonic Guard**, at this stage, consists of 10s of thousands of servers and websites, millions and millions of desktop computers and billions of cell phones and other communications devices.

Priced at \$30 each, for instance, for consumers and at \$20 each for corporate users, the sale of 10,000,000 copies would involve \$200-300 million. Mnemonic Guard, Inc., as publisher, will expect to receive revenue amounting to more than 50% of the gross sales. Our marketing will focus on Enterprises, Web-based businesses, Telecom Companies and providers as well as through reseller channels and VARs to approach mid-sized businesses and vertical industry-specific applications.

Among the major customers are

- Ministry of Defense: mobile PC logon and encryption solutions
- NTT Communications: online payment service (PC & mobile-phones)
- Ikeda Bank: log-on (smart-phone logon)
- An edible oil producer (smart-phone logon)

Current Product Lineup

Mnemonic Guard Library for general purpose

MG for Web-Access



MG for PC logon



MG for Smart—phone logon



MG for entrance control

MG with password-manager on USB device



CryptoMnemo : MG-based encryption solutions

Remark: 4 million dollars have been invested into development of the above product lineup.



In addition to the base product for enhancing the user's Security Experience, **Mnemonic Guard** can also serve as the foundation for complex applied solutions such as follows:

Phish Fighting: **Mnemonic Guard** shows the same effect as the RSA Security's SiteKey when users have registered their own unique images on-line. And this phisher-repellent effect is inherently built into the user verification function of Mnemonic Guard. Furthermore, when the verification images are displayed randomly, at different positions on each access, the phishing cost of capturing such ever-changing verification screens for each user would become astronomical.

Neutralizing Trojan Horses: Current "Onetime-password" systems available on the market verify only the identity of the tokens and/or cellular-devices that generate and/or receive the random numbers. A password or PIN that must be fed to PCs for verification of token/phone ownership would be exposed to Trojan horses.

The onetime-password system that is built with **Mnemonic Guard** can prove the identity of the cellular-phone which receives verification pictures with random characters along with the identity of the person who must be able to recognize the characters allocated to the correct pictures. The whole verification data stream that a Trojan horse might capture is a onetime event. Thus, the data stream can be stolen but is entirely useless as it cannot be used.

Hardening Protection of Classified Data: An encryption key, which had been destroyed at the end of the previous run, will be reproduced from the verification data of **Mnemonic Guard** when (only when) 3 out of up to 10 registered operators work together.

In this situation, it would be of no use to steal the verification data of a single operator. The attacker would have to steal from three operators at a time. This effectively discourages attackers who might otherwise attempt to intimidate the manager of classified data into surrender.

With all the possible forms of products in scope and considering the broad range of applicable platforms, the sales of **Mnemonic Guard** and its applied solutions could well grow to the order of billions of dollars globally in 10 years time.



- 1. Those who still recommend character-based passwords:** Computers become ever more powerful, subsequently it is ever more difficult to manage passwords which have to become ever longer and complex. Conversely, powerful computers, however, also bring down the cost of handling digital images, which indicates that our solutions will increase in benefit and decrease in processing costs in years to come.
- 2. Those who offer onetime-password-generating tokens:** Such onetime-passwords prove only the identity of the token, not the person. Our solutions directly verify the identity of a person.
- 3. Those who offer simple graphical passwords:** Graphical passwords are comparatively easier to manage than character-based passwords, but only comparatively. Our solutions, are explicitly based on long-term visual memories, and the innate abilities of the human mind are different, and we believe much better.
- 4. Those who recommend identification technologies:** Tokens and biometrics, which could be practiced by somebody else while the user is unconscious, are not the appropriate user authentication means on their own, but they could be good auxiliary means to memory-based user authentication.



We own the copyrights of all the software products and applied solutions sold under the trademarks of “**Mnemonic Guard**”, “**CryptoMnemo**”, “**Pass-Symbol**” and “**Anonymity Guard**”. (Those trademarks are registered in Japan.)

3 patents are pending as PCT that are related to making use of visualized episode memory for computerized user authentication, algorithm of differentiating the sort of mistakes the legitimate user can easily make from the sort of mistakes the legitimate user is unlikely to make, registering an emergency symbol to silently tell the presence of the intimidator and mutually verifying the visual memories in the user's brain and in the memory device of the server.



Alliance & Contact

Mnemonic Guard

Alliance: Theoretical

Professor Hideki Imai (one of Japan's most reputed cryptographers)
Director of Research Center for Information Security of AIST

<http://www.rcis.aist.go.jp/index-en.html>

Chairman of CRYPTREC

<http://www.cryptrec.go.jp/english/index.html>

Alliance: Commercial

FUJISOFT, AXSEED, BASIC, Toppan NSW, Index, Accenture Japan, etc.

For Further Information

Visit our English website: <http://www.mneme.co.jp/english/index.html>
(not yet as comprehensive as Japanese pages, though)

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